REMARKS

Applicant wishes to thank Examiner Lucas and Supervisor Housel for the courtesy extended to Nancy Vensko, attorney of record, on July 21, 2005. The Interview Summary Form PTOL-413A summarizes the discussion held at the personal interview (attached). The present response to the outstanding Office Action includes the substance of the Examiner Interview.

A. Disposition of Claims

Claims 1-4, 6, 9, 10, 14-21 are pending in this application. Per Office Action dated 17 Feb 2005, p. 2, ¶ 2, Claims 5, 7, 8, and 11-13 have been canceled without prejudice as being drawn to non-elected subject matter. Claims 1 and 2 have been re-written so that Claim 2 depends from Claim 1 by containing a reference thereto and then specifying a further limitation of the subject matter claimed so as to comply with 35 USC 112/4 and to introduce an acronym (BVDV) by the words from which the initials are formed, Claim 3 has been corrected for punctuation, Claims 3, 4, and 6 have been re-formatted to relate back to the original subject matter, Claim 9 has been amended so that it does not serve as the basis for another multiple dependent claim (Claim 20) so as to comply with 35 USC 112/5, Claim 21 has been updated to excise non-elected subject matter and to conform to Claim 9, and Claims 14-19 have been amended to describe with more particularity the claimed subject matter and thus for reasons unrelated to patentability. Support for the amendment is found throughout the patent specification, for example, at p. 25, line 25 – p. 26, line 4 and Table 4. No new matter has been added. Reexamination and reconsideration of the application, as amended, are respectfully requested.

B. Compliance with Formalities

The issue is whether the claims are in compliance with all formalities. Claims 1 and 2 have been re-written to introduce an acronym (BVDV) by the words from which the initials are formed, and Claim 9 has been amended so that it does not serve as the basis for another multiple dependent claim (Claim 20) so as to comply with 35 USC 112/5. The conclusion is the claims are in compliance with all formalities.

C. Compliance with 35 USC 101

The issue is whether Claims 14, 15, 18, and 19 are in compliance with 35 USC 101 or are directed to non-statutory subject matter. The rule under MPEP 2105 is that, if the broadest

reasonable interpretation of the claimed invention as a whole encompasses a human being, then a rejection under 35 USC 101 must be made indicating that the claimed invention is directed to non-statutory subject matter. Although a cell is a basic unit of living thing, the claims have been amended to make explicit that which was implicit in the claims, namely, that the claimed embodiment encompasses no more than a cell. The element "isolated" distinguishes from a human being. The conclusion is that the claims are in compliance with 35 USC 101.

D. Compliance with 35 USC 112/2

The issue is whether the claims are in compliance with 35 USC 112/2 as being definite. Claims 1 and 2 have been re-written so that Claim 2 depends from Claim 1 by containing a reference thereto and then specifying a further limitation of the subject matter claimed so as to comply with 35 USC 112/4 and consequently with 112/2. The conclusion is the claims are in compliance with 35 USC 112/2.

E. Compliance with 35 USC 112/1

The issue is whether Claims 16-19 are in compliance with 35 USC 112/1. The Patent Office takes that position that the specification, while being enabling for chimeric virus produced by a host cell infected by BVDV, and transfected by a DNA or RNA construct of Claim 9 or 10, does not reasonably provide enablement for chimeric virus produced by any cell transfected with the DNA or RNA constructs. The Patent Office cites the patent specification and the post-filing date art of Nam et al., 2001, J Virol Methods 97: 113 for the proposition that the operative host cells were observed to be infected by a helper BVDV required for packaging chimeric genomes into infectious particles. Although the claims encompass host cells infected by a helper BVDV required for packaging chimeric genomes into infectious particles, the claims have been amended to make explicit that which was implicit in the claims, namely, that the claimed embodiment encompasses only operative subject matter. The element "infected by BVDV" distinguishes from host cells not infected by a helper BVDV. The conclusion is that the claims are in compliance with 35 USC 112/1.

F. Compliance with 35 USC 103(a)

The issue is whether the claims are in compliance with 35 U.S.C. §103(a) or unpatentable as being obvious over Vassilev et al., 1997, J Virol 71: 471 in view of Kashiwakuma et al., 1996, J Immunol Methods 190: 79 and Maertens et al. (WO 96/04385). The rule according to MPEP

2143 is that to establish a *prima facie* case of obviousness: First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings; Second, there must be a reasonable expectation of success; and Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Here, none of these factors is present thus negating a *prima facie* case of obviousness.

The prior art reference (or references when combined) do not teach or suggest all the claim limitations. Vassilev 1997 describes a molecular clone of BVDV by substitution of E2 with that of another BVDV strain, giving rise to an *inter-strain* BVDV chimeric virus. The secondary references describe diagnostic methods for detecting HCV envelope or core proteins. Hence, the references do not teach a molecular clone of BVDV by substitution of an envelope or core gene with that of a HCV virus, giving rise to an *inter-species* HVC/BVDV chimeric virus.

There was no reasonable expectation of success. While Vassilev 1997 speculates, on p. 477 in the last sentence of the penultimate paragraph, that "it may be possible to use BVDV as a vector to express foreign proteins for immunization purposes", the author contemplates addition of genes rather than substitution of genes (as in the claimed invention) by the preceding sentence of that same paragraph: "Although the upper limits of viable BVDV genomes is unknown, at least 2 kb of additional coding sequence can be part of viable viruses". Additionally, despite the conjecture by Vassilev 1997 on p. 477 in the last paragraph that "It will be of interest to determine whether interspecies chimeras of swine and bovine pestiviruses with hepatitis C or G viruses are viable", this is no more than a hope or research plan and hardly a reduction to practice of the claimed invention in which an inter-species chimera of BVDV with HCV was determined to be viable as a pseudovirus in which host cells infected with a helper BVDV were observed to be required for packaging chimeric genomes into infectious particles. The art was unpredictable, as conceded Vassilev 1997 on p. 471, col. 1, ¶ 1, in acknowledging "each group [HCV and BVDV] has certain unique biological features which make general extrapolation difficult" and as attested to by the obtaining of a pseudovirus as opposed to a virus that was encapsidated into virions containing HCV structural proteins.

There was no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or

combine reference teachings. As proof, Hong et al., USP 6,326,137, issued 4 Dec 2001 and filed 25 June 1999, of record, published as Lai et al., 2000, J Virol 74: 6339, attached, describes a molecular clone of BVDV by substitution of the Npro protease coding region with that of a HCV NS3 protease, giving rise to a chimeric virus, in which the junction site between the HCV NS3 protease and the BVDV core protein recognized by the BVDV Npro protease is replaced with a junction site recognized by the HCV NS3 protease. Hong et al. teaches away from the claimed invention by introducing the possibility that the polyprotein encoded by the chimeric HCV/BVDV genome might not be processed into cleavage products, because the BVDV Npro protease would be unable to cleave between the Npro and the HCV core protein. Nevertheless, attached is DECLARATION UNDER 37 CFR 1.132 OF SUZANNE U. EMERSON, Ph.D. Dr. Emerson is a named inventor and expert in the field. Dr. Emerson testified that infectious HCV/BVDV expressed core, E1, and E2 proteins of HCV.

For these reasons, the references, whether considered alone, or in combination, fail to teach or suggest all the claim limitations, there was no reasonable expectation of success, and there was no suggestion or motivation to modify or combine references to achieve the claimed invention, a *prima facie* case of obviousness cannot stand. The conclusion is that the claims are non-obvious over the references. Thus, the claims are in compliance with 35 U.S.C. §103(a).

CONCLUSION

In view of the above, it is submitted that the claims are in condition for allowance. Reconsideration and withdrawal of all outstanding rejections are respectfully requested. Allowance of the claims at an early date is solicited. If any points remain that can be resolved by telephone, the Examiner is invited to contact the undersigned at the below-given telephone number.

Respectfully submitted,

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